MAGNETIZED SEED IN SASKATCHEWAN

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Work on magnetized seed is not new. It has been reported in literature back to 1963. The present method of treatment consists of passing the seed through a magnetic field. The time required in the magnetic field is very short--simply dropping the seed between two magnets can give results. The strength of the magnet is not too critical; results have been obtained from magnetic fields with a wide range of strengths.

In the last two years interest in magnetic seed treatment has increased, with the result that many types of equipment for treating seed have appeared on the market. Tests on the effectiveness of several of these machines have been conducted by at least four research institutions in the last two years to see if we could get results similar to those obtained elsewhere.

I would like to pause here and point out that this paper is not intended to discredit the results obtained in the Lethbridge area by Mr. Pittman. My question is why are the Saskatchewan results different than his. In discussion with Mr. Pittman I find that this is of major concern to him also.

Now to deal with the work that has been done in Saskatchewan. Unless otherwise mentioned, all tests reported were replicated, and unless indicated, all the differences mentioned are statistically significant.

Research Station, Melfort. Dave Warnock used two machines, Pittman's permanent magnets and the Zapper, an electro-magnetic machine, on two varieties each of wheat, barley, oats, and rape. There were no significant differences in yield on any of the varieties due to magnetic treatment. To see if there was any difference between machines the actual increase (or decrease) for yield, weight per bushel, and 1000 kernel weight were examined. As shown in Table 1, both machines gave approximately the same number of increases or decreases for the different measurements.

Summary from Melfort - No advantage to magnetic treatment - possible disadvantage.

Research Station, Indian Head. Roy McIver. Tests were conducted at seven locations in 1975 comparing treated and nontreated seed of Neepawa wheat, Kelsey oats, Bonanza barley and Norland flax (at six locations). There were no significant differences in yield at any location for wheat or flax, a decrease at one location for oats and one increase and one decrease for barley. No statistical analysis was carried out on the other factors measured.

To compare the variations obtained between the different crops, the number of locations where there was an increase (+) or decrease (-) (not necessarily statistically significant) is shown in Table 2. From these data it would appear that maybe the different crops behave differently for different measurements.

Summary for Indian Head - No advantage in yield on any of the four crops - possible slight disadvantage for oats.

Crop Science Department, University of Saskatchewan, Saskatoon. Dr. H. Austenson. In 1975 they used a split-split plot design with several cultivars for each of six crops. Seeding west gave consistently higher yields than seeding north; significantly different for wheat, barley and oats (Table 4). There were minor increases or decreases in yield from the three magnetic seed treatments over the yield from the untreated seed, but none of these differences were significant (Table 5). There was no trend for one treater to be better than the others.

In the analysis of data for each crop, the interaction between direction of seeding and cultivars, direction of seeding and magnetic treatment, and cultivars and magnetic treatment was calculated (Table 6). There were only

three of the eighteen interactions that were significant.

Earlier emergence of the magnetically treated barley was observed but could not be seen three days later.

Summary for Crop Science Department, University of Saskatchewan, Saskatoon - No yield advantage from magnetically treated seed on any of six crops.

Research Station, Swift Current. D. Read and J. McElgunn. Tests were conducted at seven locations in 1974 and at nine locations in 1975 using Neepawa wheat, Conquest barley, Wascana durum and Sioux oats. The seed was passed through the seed energizer that Pittman uses (Agrotronics), half with no power to the coils and half with the coils energized. The tests were arranged in a replicated split plot design with crops as the main plots and treatments as the subplots. The measurements that were analyzed statistically were total sheaf wt, grain wt, weight per bushel, weight for 1000 kernels, and for 1974, the percent N and P in the grain.

Although the plots were observed several times during the year, there were never any distinct differences in appearance noted between the adjacent plots where magnetized and nonmagnetized seed had been planted. At some locations slight differences could be observed.

Table 3 shows the number of tests where there were statistically significant increases (+) or decreases (-) over the untreated for the various measurements. As far as yield is concerned there is no advantage and only in three or less tests out of the 15 or 16 were there any differences. There is a bit more significance for the yield of grain plus straw and when you look at the number of differences there are for 1000 kernel wt and weight per bushel it looks like magnetism is doing something. With these measurements there are 9 or 10 significant differences out of the 15 or 16 tests. These differences were not all beneficial but the number of beneficial ones varies with the crop.

Another test conducted at Swift Current in 1975 consisted of different varieties of grain with the seed from different sources and passed through different

treaters. There were eight varieties from four seed sources and five treaters. The test did not include all combinations of these but did consist of 21 main treatments, each of which were split into treated and untreated. When the results for each variety were grouped together there was no significant difference between treated and untreated plots for total plant production, grain yield, 1000 kernel wt, weight per bushel, or maturity. The treaters used ranged from permanent magnets, the Agrotronics, another electro magnetic system, and a $\frac{1}{4}$ H.P. electric motor with the armature removed and a piece of plastic fitted inside the coils.

Summary for Swift Current - No advantage on yield but may be having some effect on 1000 kernel wt and weight per bushel.

One other test that I want to report on was conducted by Mr. Wayne Bird from Matador. He used Neepawa wheat and took paired plot square yard samples which were threshed and analyzed at Swift Current. He used magnetically treated and untreated seed on fertilized and unfertilized strips. There was no significant difference in yield or total plant material between magnetized and nonmagnetized seed or between fertilizer and no fertilizer. There was a significant interaction. The magnetic treatment decreased the yield on the unfertilized strip but increased the yield on the fertilized strip.

What does this all add up to? In looking at all the data I am convinced that magnetic treatment does something, as indicated by the number of significant differences in bushel and kernel weight. In the tests in Saskatchewan these differences do not carry through to influence the yield. The effect of magnetism is not always beneficial, and there is no way of predicting when and where the effect will be beneficial. From the results I can not recommend the magnetic treatment of seed in Saskatchewan. This leaves us with another unanswered question. Why do we get results that differ from those obtained elsewhere?

Table 1. Number of variations from results obtained from untreated seed of eight varieties at Melfort - 1975 (not necessarily statistically significant)

Treater	Yield of grain	Bushel weight	1000 Kernel weight
Pittman	3(+)* 5(-)**	1(+) 5(-)	3(+) 3(-)
Zapper	2(+) 6(-)	2(+) 3(-)	3(+) 2(-)

* (+) Indicates the number of varieties on which there were increases over untreated.

**(-) Indicates the number of varieties on which there were decreases over untreated.

Table 2. Number of variations from the results obtained from untreated seed at seven locations near Indian Head - 1975 (not necessarily statistically significant)

Measurement	Wheat	Oats	Barley	Flax (6 locations)
Yield of grain	1(+)* 6(-)**	2(+) 5(-)	6(+) 1(-)	2(+) 4(-)
Yield (significant)	0	1(-)	1(+) 1(-)	0
Days to mature	1(+)	5(-)	3(+) 2(-)	2(+) 1(-)
Lodging	3(+)	2(+) 1(-)	0	0
Height	4(+) 1(-)	4(+) 1(-)	3(+) 2(-)	2(+) 2(-)

* Number of locations where there were increases.

** Number of locations where there were decreases.

Table 3. Statistically significant increases (+) or decreases (-) due to magnetic treatment in 16 tests in Southwestern Saskatchewan - 1974-1975

Measurement No. of tests	Wheat 16	Oats 15	Barley 15	Durum 16
Yield of grain	1(+) 2(-)	1(+) 1(-)	1(+)	2(+) 1(-)
Yield of grain & straw	2(-)	2(+) 2(-)	3(+)	3(+)
Weight per bushel	3(+) 2(-)	7(+) 3(-)	6(+) 2(-)	3(+) 1(-)
1000 Kernel weight	3(+) 6(-)	4(+) 2(-)	7(+) 2(-)	5(+) 3(-)
% N in grain (7 tests)	1(+) 3(-)	2(+) 1(-)	2(+)	1(+) 1(-)
% P in grain (7 tests)	3(-)	2(+) 1(-)	1(+) 1(-)	1(+) 3(-)

Table 4. Yield increase from plots seeded west over yield from plots seeded north. Crop Science Dept.

Crop	Cultivars	Yield increase
Wheat	4	19*
Barley	3	215*
Oats	3	95*
Rape	2	8
Faba beans	2	36
Field peas	2	19

*Statistically significant.

Table 5. Yield increase from magnetic seed treatment over check yield. Crop Science Dept.

Crop	Zapper	Senstek	Enagizer
Wheat	2	-2	-6
Barley	111	97	-3
Oats	16	84	88
Rape	3	1	-10
Faba beans	-2	-19	-8
Field peas	82	42	49

Table 6. Significance of interactions. Crop Science Dept.

Crop	Direction X cultivar	Direction X treatment	Cultivar X treatment
Wheat	N.S.	N.S.	N.S.
Barley	*	N.S.	**
Oats	N.S.	N.S.	N.S.
Rape	N.S.	N.S.	N.S.
Faba beans	*	N.S.	N.S.
Field peas	N.S.	N.S.	N.S.